Proposed Tiered Approach for Human Health Risk Assessment at the Eagle Zinc Company Site, Hillsboro, Illinois

The proposed COPC selection process will be performed for all constituents in all media as presented in Figure 1

The exposure pathway conceptual site model depicted in Figure 2 provides the framework for the development of risk-based levels for evaluation of each COPC, exposure pathway, and receptor. In accordance with USEPA's comments, potential receptor populations to be considered include:

- On-site workers (present and future);
- On-site construction workers (future);
- On-site trespassers (present and future);
- Off-site residents (present and future); and
- Off-site recreational use of Lake Hillsboro and Mid Fork Shoal Creek (present and future).

The rationale for selection of potentially complete exposure pathways is summarized in Table 1.

To ensure that human health and the environment are protected, a risk-based, two-tiered approach will be used to (1) identify areas that may require further investigation, and (2) develop risk-based levels for affected media. This approach is depicted as a decision tree in Figure 3.

Table 1.

Summary of Potentially Complete Exposure Pathways to be Considered in the Tier 1 Risk Assessment for the Eagle Zinc Company Site, Hillsboro IL

Receptor Scenario	Potential Exposure Medium	Potential Exposure Route	Pathway Considered Complete?	Rationale/Comment
On-Site Resident	Groundwater	Potable use	No	Historical use and current zoning of the Site is industrial. Therefore, residential development is not a reasonably anticipated future land use
	Surface soil	Vapor inhalation Particle inhalation Ingestion Dermal contact		
	Subsurface soil			
On-Site Industrial Worker	Groundwater	Potable use	No	Site groundwater is not a current or potential source of potable water
	Surface soil	Vapor inhalation Particle inhalation Ingestion Dermal contact	Yes	Workers could come into contact with surface soil. Accordingly, exposure via ingestion, inhalation and dermal contact will be evaluated
	Subsurface soil	Vapor inhalation Particle inhalation Ingestion Dermal contact	No	Workers would not contact subsurface soil under reasonably foreseeable conditions
On-Site Construction Worker	Groundwater	Potable use	No	Site groundwater is not a current or potential source of potable water
		Dermal contact	Yes	Construction workers could contact groundwater while excavating
	Surface soil	Vapor inhalation Particle inhalation Ingestion Dermal contact	Yes	Construction workers could contact surface and subsurface soil during excavation and building activities. Accordingly, exposure via ingestion, inhalation, and dermal contact will be evaluated
	Subsurface soil			
On-Site Trespasser	Groundwater	Potable use	No	Site groundwater is not a current or potential source of potable water

	Subsurface soil	Vapor inhalation Particle inhalation Ingestion Dermal contact	No	Trespassers would not contact subsurface soil under reasonably foreseeable conditions
	Surface soil	Vapor inhalation Particle inhalation Ingestion Dermal contact	Yes	Trespassers could come into contact with surface soil Accordingly, exposure via ingestion inhalation and dermal contact will be evaluated
	Surface water	Ingestion Dermal contact	Yes	Surface water runoff as well as site groundwater could flow into the southwestern pond which could attract trespassers Therefore, swimming contact with COPCs in surface water and sediment will be considered in the risk assessment
	Sediment	Ingestion	Yes	
		Dermal contact	No	Exposure to COPCs via dermal contact with sediment is considered to be negligible
Off-Site Resident	Groundwater	Potable use	No	Potable water in this area is supplied by the city Further the low yield of the affected aquifer makes its development as a water source unlikely
	Surface soil	Particle inhalation Ingestion Dermal contact	No	Off-site migration of affected surface soil does not appear to have occurred Therefore this potential exposure pathway is not complete
	Surface water	Potable use	Yes	Lake Hillsboro is used as a regional drinking water source Although the intake is distant from the point of confluence with water bodies affected by the Site, this potential pathway will be evaluated to ensure that drinking water quality is not impacted
Off-Site Recreational User	Surface water	Ingestion Dermal contact	Yes	Surface water runoff from the Site empties into Mid Fork Shoal Creek and Lake Hillsboro Recreational users wading and swimming in these water bodies could be exposed to chemicals present in surface water and sediment
	Sediment	Ingestion	Yes	
		Dermal contact	No	Exposure to COPCs via dermal contact with sediment is considered to be negligible

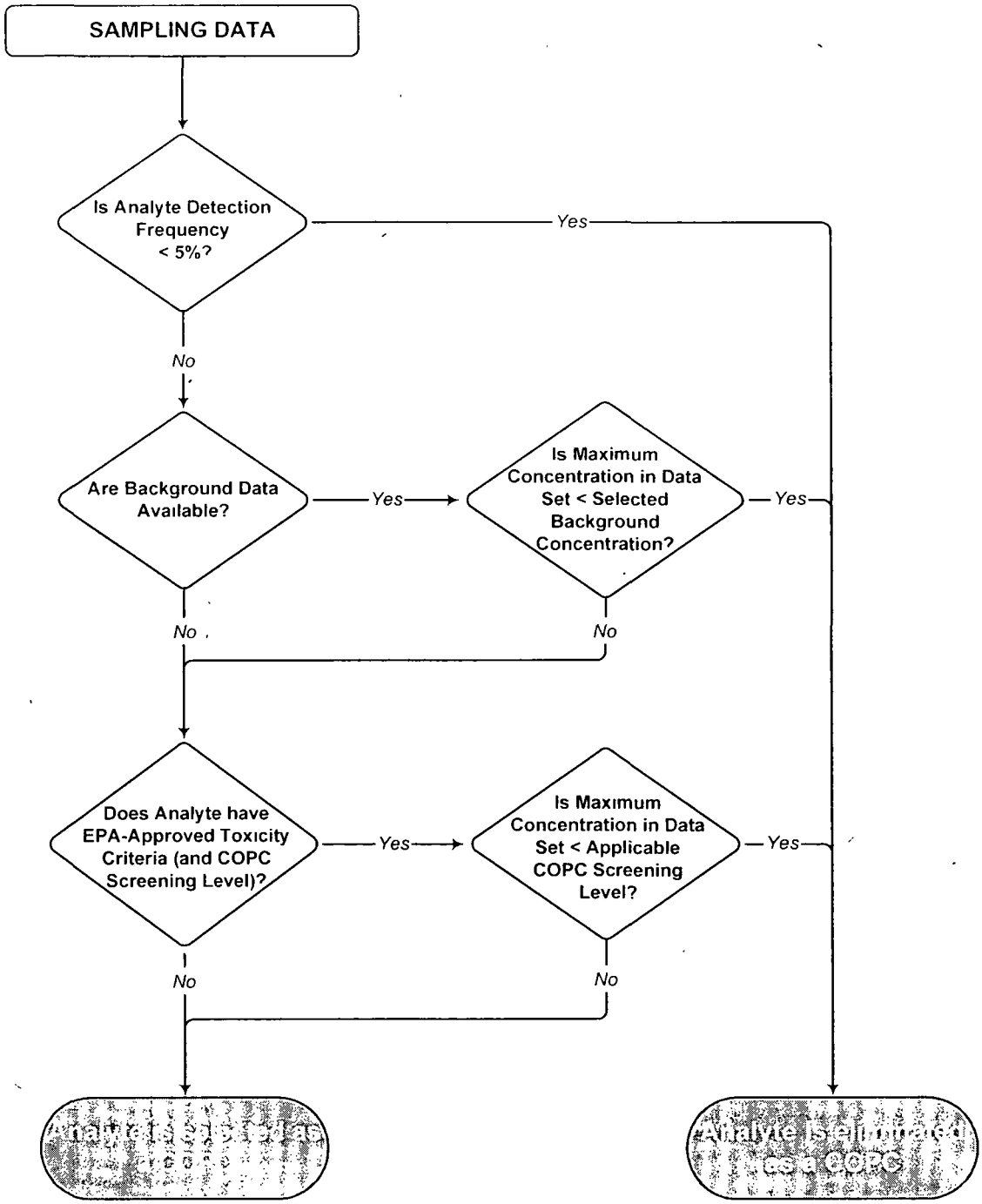

Figure 1

Decision Process for Selection of Chemicals of Potential Concern

Eagle Zinc Company Site
Hillsboro, Illinois

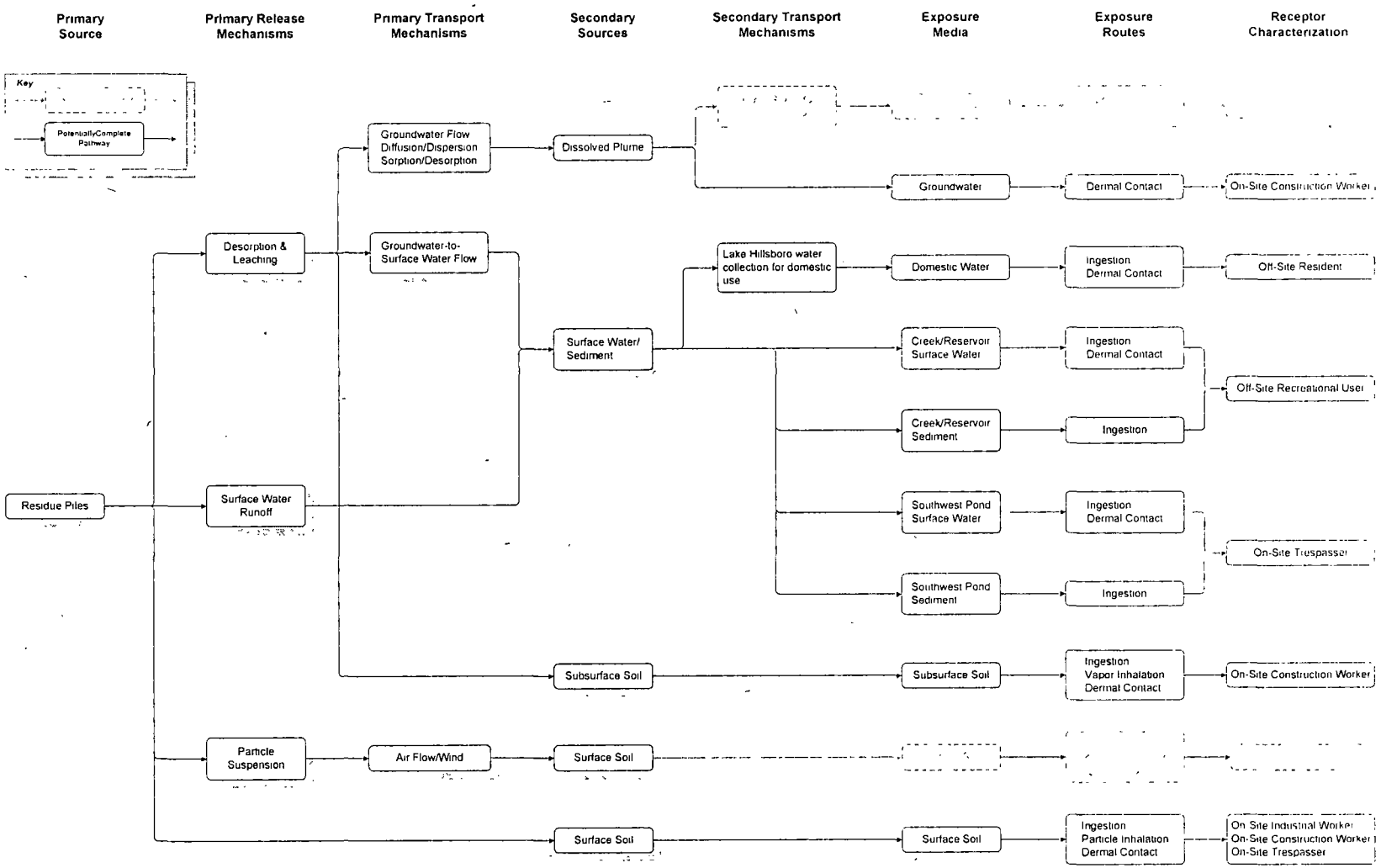

Figure 2
Exposure Pathway Conceptual Site Model
Eagle Zinc Company Site
Hillsboro, Illinois

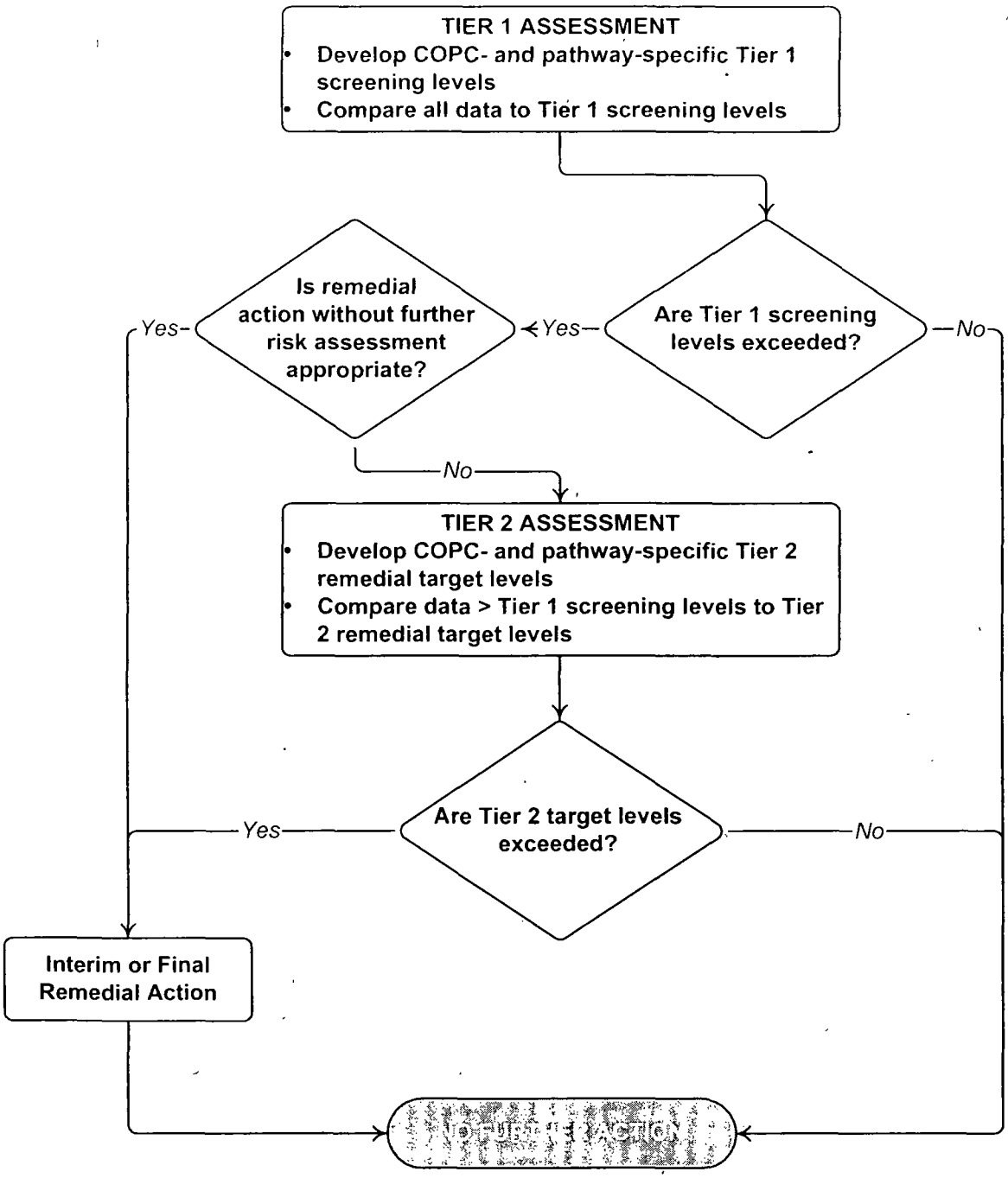

Figure 3

Conceptual Decision Tree

Eagle Zinc Company Site
Hillsboro, Illinois

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

December 30, 2003

Roy Ball
Environ Corporation
740 Waukegan Road
Suite 401
Deerfield, IL 60015

Re: Preliminary Information on Human Health and Screening Level Ecological Risk Assessment document dated November 3, 2003-Eagle Zinc Site, Hillsboro, Illinois

Dear Roy

I have received and reviewed this document, and have coordinated comments with the Illinois EPA regarding its contents The following constitute Agency input at this stage of the risk assessment process.

General Comments

On page 1 of your document, you describe the human health risk assessment process as following the steps outlined in the IEPA's "Tiered Approach to Corrective Action Objectives"-Title 35, Part 742 of the Illinois Administrative Code. You further state that TACO is based on assumptions developed by EPA and "is consistent with EPA guidance."

As stated to you previously, the use of TACO is not sufficient to meet risk assessment requirements for NPL caliber sites. Neither EPA nor Illinois EPA considers the TACO criteria to be ARARs for CERCLA remedial actions. These criteria are not enforceable and not mandated by IEPA, rather, they are used as soil screening guidance. As they are not considered an ARAR for the Eagle Zinc site, their use is limited to their primary function, which is to help screen soil contaminant data. The absence of exceedances of TACO criteria is not a sufficient reason for screening out constituents from further risk analysis under established CERCLA procedures.

You state beginning on page 4 that no further action is the appropriate response to COPC concentrations below TACO criteria. This is not acceptable as outlined above. The Risk Assessment Guidance for Superfund (RAGS) is the correct guidance for the risk assessment at Eagle Zinc and is what EPA requires as the basis of the completed draft risk assessment.

Specific comments

1. HHRA Section 4. Additional detail should be provided regarding how data will be presented and evaluated for purposes of estimating exposure point concentrations, particularly with respect to how distribution testing will be conducted, how hierarchy of various estimating methods will be applied to data sets, and how data will be grouped into exposure units.

2 HHRA Section 5. While the conclusions about future land use may appear reasonable based on current zoning, and given the recent communication from the City regarding the site, some sort of tangible evidence must be presented before EPA can preclude the potential for future residential development at the site. Other potential COPCs may be added to the site list based on the additional sampling conducted in November 2003, particularly additional organics. These should be added to the list of COPCs based on the results of this additional sampling. Given that the potential for trespassers is higher now that site production has now been halted, it is uncertain that the conclusions presented in Section 5.1.3 can be justified-consequently, the trespasser scenario must be included in the HHRA. There exists the potential for completed pathways for groundwater to surface water for on-site receptors, particularly in the southwestern pond-this potential should be fully evaluated in the HHRA, based on available site data.

3. HHRA Section 6. Adjustments to toxicity values to be consistent with exposure assumptions should be applied and evaluated as uncertainties, and not applied to the RME scenarios.

4. HHRA Section 7. The progression of chemicals and media from one tier to the next must be very well documented and TACO should not be used as the deciding factor for establishing these tiers.

5. Table 2. If the potential for dermal exposure to groundwater is small, then the exposure pathway is complete and should be evaluated, regardless of whether Environ considers the exposure to be negligible. There continue to be reports of area citizens using private wells in the site vicinity-without some sort of comprehensive survey, it cannot be stated with certainty that the aquifer is not a source of water for the area. Finally, EPA comments asked for the evaluation of off-site migration of dust from the residue piles as a part of the investigation. Modeling results or specific data must be presented to substantiate any preliminary conclusion here that dust has not migrated off site and no complete exposure pathway exists.

6. SLERA. One consistent guidance should be used for the preparation of the SLERA-this should be EPA-1997 as is referenced herein. The impact of physical disturbances on ecological receptors is indicated as a significant stressor at the site. Differentiating chemical and physical

stressors at the site will be an important step. For the benthic community, sample locations downstream of sediment inputs may have both physical and chemical impacts. Other stressors, particularly physical stressors, should be considered at the site. However, conservative assumptions should be employed for a SLERA and assessment endpoints with complete exposure pathways should be evaluated for chemical stressors. Specifically, the benthic community and terrestrial receptors should be considered impacted from chemical stressors without other site-specific assumptions.

7. SLERA screening level problem formulation. Screening ecotoxicity values (NOAELs and LOAELs) and exposure parameters compiled for wading birds and piscivorous mammals must be provided in the SLERA. Sources are not provided for values listed here but must be reviewed for correctness in the review of the SLERA.

8. Page 2 par 2. Assessment and measurement endpoints should be provided for review to ensure appropriateness. It is suggested that a list of all terrestrial and aquatic receptors on the site be provided, as well as an expanded description of the habitats.

9. Page 2 par 4. An evaluation of the on-site terrestrial receptors is recommended. The Appendix A checklist identified several terrestrial receptors observed during the site visit. Because adverse health effects were observed during the site visit, these receptors should be evaluated. Some portions of the site will most likely remain undeveloped, even as other portions of the site are redeveloped. Ecotoxicity values and exposure parameters for these receptors should be provided and tissue uptake and bioaccumulation from soil should be added to the site CSM

10. Page 3 par 2. It is recommended that the chronic exposure surface water screening ecotoxicity values (Illinois WQC and ~~US~~EPA) and lowest effect levels (LELs) from Persaud et al. (1993) be used for the SLERA.

11 Page 3 par 5. Note that bioaccumulation factors are appropriate and recommended for estimating dietary exposure to higher trophic levels if measured tissue concentrations are not available.

12. Page 4 par 2. Correct to "An HQ <u>more</u> than 1.0 suggests that..."

13. Page 4 par 3. The SLERA should provide a definition of the community-level of effects to be evaluated. A community- or population-level of assessment should be clearly defined, as this level of assessment may include an evaluation of site-specific assumptions, such as spatial evaluation or a refinement of contaminants of concern, which is not appropriate for a SLERA. Refining contaminants of concern by evaluating frequency and magnitude of detection, background concentrations, or dietary considerations should be reserved for a baseline ERA.

14. Checklist Should provide additional description of the adverse impacts to trees in the northern part of the site.

15. CSM. Surface water ingestion should be included as a complete exposure pathway for wading birds and piscivorous animals. Further clarification should be provided on the "land use" column, or it should be removed. It is not clear if all relevant receptors considered have on-site habitat. "Habitat requirements consistent with current or future uses" for terrestrial receptors is not consistent with the main text (page 2, par 4).

If you have any questions regarding these comments or desire a meeting to discuss, please contact me.

Sincerely yours,

Dion Novak

Dion Novak
Remedial Project Manager

cc: R. Lanham, IEPA
T. Krueger, EPA
M. Mankowski, EPA
C. English, CH2M Hill

ENVIRON

Via Electronic Mail

January 26, 2004

Mr. Dion Novak
Superfund Division
United States Environmental Protection Agency
77 West Jackson Boulevard
Mail Code: SR-6J
Chicago, Illinois 60604

Re: Eagle Zinc Company Site, Hillsboro, Illinois

Dear Mr. Novak:

On behalf of the Eagle Zinc Parties, ENVIRON and Limno-Tech, Inc. have reviewed your comment letter dated December 30, 2003, which provided preliminary input concerning risk assessment information submitted on November 3, 2003. We have also reviewed your electronic mail correspondence dated January 14, 2004. Two issues were raised in this correspondence: (1) the schedule for completion of the human health and ecological risk assessments, and (2) the presence of low detectable levels of VOCs in surface water and sediment in the Western Drainageway. As we discussed with you by telephone on January 21, 2004, this letter responds to both your December 30, 2003 letter and January 14, 2004 correspondence.

Risk Assessment Schedule

In a letter dated November 4, 2003, USEPA indicated that the draft Phase 2 Technical Memorandum was approved subject to several comments. The most significant of these comments concerned the VOCs detected in the Western Drainageway (on-site) and required further discussion, preparation of a sampling plan for USEPA approval, and implementation of the additional sampling. The final Phase 2 Technical Memorandum, which included significant modifications, was submitted to USEPA on November 26, 2003. It was our understanding that USEPA's written approval of each final report submittal determines the timing for the next phase of work. While waiting for such written approval, we received extensive and substantive written comments from USEPA in a letter dated December 30, 2003 on our preliminary risk assessment technical memorandum. To assume that our 60-day period to prepare the draft Risk Assessment Plans ended on January 4, 2004 (60 days from November 4, 2003) would have only allowed 5 days to respond to and/or incorporate EPA's extensive comments. As a result, it was not until your e-mail of January 14, 2004 that we were aware of our mutual misunderstanding of the submittal date for the draft Risk Assessment technical memorandum.

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www.environcorp.com

The intervening time (*i e* , from November 4, 2003 to the present) has been productively used At USEPA's request, we have had discussions with USEPA and its representatives concerning the methodologies to be employed in performing the human health and ecological risk assessments. This communication process has included the submission of initial and revised preliminary risk assessment work plans in November 2003 and receipt of substantive comments We believe that these "up-front" discussions have been very useful, as they will almost certainly reduce the number of iterations required following submission of the draft risk assessment technical memorandum.

Please note that USEPA comments in the December 30, 2003 letter impact such fundamental elements as overall risk assessment framework, COPC selection process, and identification of receptors of concern and potentially complete exposure pathways to be considered. In addition, the USEPA's December 30, 2003 letter expresses a need for "tangible evidence" to "preclude the potential for future residential development at the site," and also requests consideration of on-site recreational and trespasser scenarios. Finally, several of the December 30, 2003 comments concerned potential on-site ecological pathways and receptors. The risk assessments clearly cannot be completed until these issues are discussed further and mutually agreeable resolutions achieved.

To allow for sufficient time to complete risk assessments that will be acceptable to the Agencies, we propose to submit the draft risk assessment technical memorandum within 45 days following resolution of the fundamental issues raised in USEPA's December 30, 2003 letter. Our responses to these comments, including requests for further clarification or discussion, are presented below.

Responses to December 30, 2003 Comments
The USEPA's comments are repeated below in italics, followed by our responses.

General Comments

On page 1 of your document, you describe the human health risk assessment process as following the steps outlined in the IEPA's "Tiered Approach to Corrective Action Objectives"-Title 35, Part 742 of the Illinois Administrative Code. You further state that TACO is based on assumptions developed by EPA and "is consistent with EPA guidance."

As stated to you previously, the use of TACO is not sufficient to meet risk assessment requirements for NPL caliber sites. Neither EPA nor Illinois EPA considers the TACO criteria to be ARARs for CERCLA remedial actions. These criteria are not enforceable and not mandated by IEPA, rather, they are used as soil screening guidance. As they are not considered an ARAR for the Eagle Zinc site, their use is limited to their primary function, which is to help screen soil contaminant data. The absence of exceedances of TACO criteria is not a sufficient reason for screening out constituents from further risk analysis under established CERCLA procedures.

You state beginning on page 4 that no further action is the appropriate response to COPC concentrations below TACO criteria. This is not acceptable as outlined above.

The Risk Assessment Guidance for Superfund (RAGS) is the correct guidance for the risk assessment at Eagle Zinc and is what EPA requires as the basis of the completed draft risk assessment.

Response. We would like to request clarification of this comment It appears that USEPA is saying that while the only permissible use of TACO "criteria" (presumably Tier 1 remediation objectives) is to "help screen soil contaminant data," they cannot be used for COPC identification as proposed in the human health risk assessment work plan ("the absence of exceedances of TACO criteria is not a sufficient reason for screening out constituents .. ").

As indicated in the response to Comment No. 4, a tiered risk assessment approach applicable to this site and consistent with RAGS will be developed and documented in the risk assessment report.

Specific comments

1. HHRA Section 4. Additional detail should be provided regarding how data will be presented and evaluated for purposes of estimating exposure point concentrations, particularly with respect to how distribution testing will be conducted, how hierarchy of various estimating methods will be applied to data sets, and how data will be grouped into exposure units.

Response: As indicated in the human health risk assessment work plan, final selection of the most appropriate statistical techniques will be made based on a thorough examination of each data set. A complete description of all data manipulation will be provided in the risk assessment report.

2. HHRA Section 5. While the conclusions about future land use may appear reasonable based on current zoning, and given the recent communication from the City regarding the site, some sort of tangible evidence must be presented before EPA can preclude the potential for future residential development at the site. Other potential COPCs may be added to the site list based on the additional sampling conducted in November 2003, particularly additional organics. These should be added to the list of COPCs based on the results of this additional sampling. Given that the potential for trespassers is higher now that site production has now been halted, it is uncertain that the conclusions presented in Section 5.1.3 can be justified-consequently, the trespasser scenario must be included in the HHRA. There exists the potential for completed pathways for groundwater to surface water for on-site receptors, particularly in the southwestern pond-this potential should be fully evaluated in the HHRA, based on available site data.

Response: We realize that future land use cannot be predicted with absolute certainty. We believe that the site's rural location, its, long-term historical industrial use and industrial zoning status, and the December 19 letter from the City of Hillsboro Planning Commission indicating an intention for redevelopment of the site as an industrial park

together support a reasonable conclusion under criteria set forth in RAGS Volume I Part A (USEPA 1989, page 6-7) and the National Contingency Plan (55 Fed Reg at 8710) that the likelihood that future land use will be either residential or recreational is small We would like to discuss this issue further with USEPA to better understand what further demonstration may be required.

As requested, additional data will be subjected to the COPC screening process, which will be fully documented in the risk assessment report

As requested, a trespasser scenario will be quantitatively considered in the risk assessment. This scenario will include contact with surface water.

3. HHRA Section 6. Adjustments to toxicity values to be consistent with exposure assumptions should be applied and evaluated as uncertainties, and not applied to the RME scenarios.

Response: As requested, toxicity criteria will not be adjusted to comport with exposure assumptions

4. HHRA Section 7. The progression of chemicals and media from one tier to the next must be very well documented and TACO should not be used as the deciding factor for establishing these tiers.

Response: As USEPA has indicated its disapproval of TACO for this site; a tiered approach applicable to the site will be developed in accordance with RAGS. All steps in this process will be fully documented in the risk assessment report.

5. Table 2. If the potential for dermal exposure to groundwater is small, then the exposure pathway is complete and should be evaluated, regardless of whether Environ considers the exposure to be negligible. There continue to be reports of area citizens using private wells in the site vicinity-without some sort of comprehensive survey, it cannot be stated with certainty that the aquifer is not a source of water for the area. Finally, EPA comments asked for the evaluation of off-site migration of dust from the residue piles as a part of the investigation. Modeling results or specific data must be presented to substantiate any preliminary conclusion here that dust has not migrated off site and no complete exposure pathway exists.

Response: The pathway of dermal exposure will be evaluated as requested.

The other two issues are directly related to comments provided on May 14, 2002 in a two electronic mail messages. On May 20, 2002, ENVIRON provided the following responses to these comments via an electronic mail transmission. The issue concerning dust migration was also discussed in the Phase 1 Technical Memorandum. ENVIRON's previous responses to these issues are reiterated as follows:

May 14, 2002 USEPA Comment. Rick Lanham of IEPA recently provided you with the following comment, which was then forwarded to ENVIRON "My review of the RI/FS determined that there is a major flaw in that no off-site soil sampling is included and this pathway is not included in the Site Conceptual Model It appears that Environ has errored in regard to the findings of the 1994 ESI Off-site residential contaminations was detected for numerous inorganics and Arsenic, Cadmium and Lead exceeded USEPA Removal Action Limits in numerous samples A resident has already inquired about health effects of putting in a vegetable garden "

May 20, 2002 Response: As discussed with USEPA and IEPA during development of the Statement of Work and preparation of the PSE Report, ENVIRON completed a detailed evaluation of all historical data for the site, including the off-site soil data collected by IEPA in 1993 as part of the CERCLA Expanded Site Inspection (ESI). As discussed in the PSE Report, no constituent concentrations detected in off-site soils were determined to be significantly different from site-specific background levels. While arsenic concentrations were determined to be different from the level detected in a local background sample, the highest detected concentration was only marginally above the average regional background level, as reflected by the non-Metropolitan Statistical Area (MSA) background value presented in the Illinois Tiered Approach to Corrective Action Objectives (TACO). In addition, arsenic is not known to have been used or released at the site. As the off-site soil samples collected by IEPA in 1993 were well-distributed around the site, the available data do not indicate any detectable impacts to off-site soils from the site. As discussed in the draft RI/FS Work Plan, the on-site soil data collected during Phase 1 of the RI will be used to assess whether off-site soil sampling may be necessary as part of the RI. ENVIRON and the Parties propose no changes to this approach.

Concerning lead and cadmium, all concentrations of these metals detected in off-site soils during the 1993 ESI are below current USEPA risk-based soil screening levels for residential land use. ENVIRON cannot comment on the resident's questions concerning growing vegetables. These questions are best directed to the local health department.

Discussion of Issue in Section IV.D of Phase 1 Technical Memorandum: "Based on available data and information concerning the residue piles, air deposition does not appear to have impacted off-site areas. As discussed above, the prevailing wind direction is from the south and south-southwest. Therefore, any impact would be the greatest in the area immediately north or north-northeast of the areas used for residue storage. A previous investigation conducted by IEPA addressed this issue through the collection of off-site surficial soil samples. None of this data suggest that off-site migration of contaminants through wind deposition has occurred. Inspection of western and northern property boundaries during the Phase 1 field activities showed no evidence of deposited residues in these areas or in adjacent off-site areas.

The Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, in Section 13.2.4 states: *As the aggregate pile*

weathers, however, potential for dust emissions is greatly reduced In fact, the half-life of this erosion potential ranges between 1 and 4 minutes Therefore, any air erosion of the piles would be limited to a very short time period immediately following emplacement and would not be expected to occur over a protracted period of time In addition, any impacts resulting from air erosion of residue piles would be expected to be the greatest closest to the source Since no on-site soil impacts in the Northern Area of investigation were identified in the Phase 1 investigation, and existing off-site data show no impacts, off-site air erosion of residue piles and subsequent deposition is not considered a viable contaminant transport pathway at the Eagle Zinc site "

May 14, 2002 USEPA Comment: *A local resident at the meeting (Earl Huston, 307 Grantham) indicated that two shallow wells are located on his property that have never been sampled He also indicated that they were registered with the county so they should have popped up on a well survey.*

May 20, 2002 Response: Several private wells in the vicinity of the site were identified in the well searches discussed in the PSE Report, including in the area northeast of the site. The PSE Report also states that all Hillsboro residents are connected to the city's public water system. The wells mentioned by Mr. Huston are located upgradient (northeast) of the site; therefore, shallow ground water would not be expected to flow from the site to Mr. Huston's property. As previously discussed with the Agency, the results of the on-site ground water investigations conducted during Phase II of the RI will be used to assess the potential need for additional on-site or off-site ground water investigation. If not used for any purpose (e.g., irrigation), Mr. Huston may wish to permanently seal the wells located on his property.

ENVIRON agrees to conduct a more in-depth evaluation of the use of private wells in the site area, as well as water purveyor information and to present the findings of such in the risk assessment technical memorandum.

6. SLERA. One consistent guidance should be used for the preparation of the SLERA-this should be EPA-1997 as is referenced herein. The impact of physical disturbances on ecological receptors is indicated as a significant stressor at the site. Differentiating chemical and physical stressors at the site will be an important step. For the benthic community, sample locations downstream of sediment inputs may have both physical and chemical impacts. Other stressors, particularly physical stressors, should be considered at the site. However, conservative assumptions should be employed for a SLERA and assessment endpoints with complete exposure pathways should be evaluated for chemical stressors. Specifically, the benthic community and terrestrial receptors should be considered impacted from chemical stressors without other site-specific assumptions.

Response: We agree that the 1997 USEPA guidance should be used in preparing the SLERA The ASTM guide was referenced because it addresses sites where habitat requirements are not consistent with current and future uses of the site. USEPA's

guidance also addresses this topic On page 1-3, the guidance states

> "Many Superfund sites are located in highly industrialized areas where there could be few if any ecological receptors or where site-related impacts might be indistinguishable from non-site-related impacts. For such sites, remediation to reduce ecological risks might not be needed However, all sites should be evaluated by qualified personnel to determine whether this conclusion is appropriate"

As discussed in the following text, we would like to discuss with USEPA the implications of future development on the site.

We agree that physical stressors are significant at the site. There are indications that on this site, physical and chemical impacts may be indistinguishable. For more than 90 years, the site has been used intensively for zinc smelting and other manufacturing activities, resulting in significant physical disturbances to habitats. Manufacturing and waste pile areas were cleared for buildings, roads, and railroad sidings. These activities resulted in loss of habitat and impacted surface runoff Drainage ways and storm water retention ponds were constructed to control storm water. Sedimentation from a nearby cement plant has altered benthic habitat in the SW drainage. These and other physical impacts will be documented in the SLERA.

We disagree that chemical stressors should be evaluated in the absence of site-specific assumptions As described above, the Eagle Zinc site has been significantly altered by industrial activities, and these may be indistinguishable from chemical impacts. Future development on the site will further alter habitats. We would like to discuss this further with USEPA.

7. SLERA screening level problem formulation. Screening ecotoxicity values (NOAELs and LOAELs) and exposure parameters compiled for wading birds and piscivorous mammals must be provided in the SLERA. Sources are not provided for values listed here but must be reviewed for correctness in the review of the SLERA.

Response: We will provide screening ecotoxicity values and exposure parameters for representative wading birds and piscivorous mammals, but recognize that these will be very conservative estimates with a large uncertainty. We will use as primary references the Oak Ridge National Laboratory (ORNL) document, *Ecotoxicity Thresholds for Wildlife. 1996 Revision,* and USEPA's 1993 *Wildlife Exposure Factors Handbook.*

8. Page 2 par 2. Assessment and measurement endpoints should be provided for review to ensure appropriateness. It is suggested that a list of all terrestrial and aquatic receptors on the site be provided, as well as an expanded description of the habitats.

Response: The table below provides assessment and measurement endpoints for the site A list of all terrestrial and aquatic receptors observed during the site visit was provided with the checklist attached to the October 27 memo, and these will be linked in the SLERA to descriptions of specific habitats

Ecological Assessment and Measurement Endpoints

Ecological Receptor	Assessment Endpoint	Receptor Type	Measurement Endpoints
Aquatic biota, sediment	Reduction in species richness or abundance in benthic communities resulting from toxicity	Benthic community	Receptor toxicity data (reflected in toxicity thresholds) Sediment concentrations
Aquatic biota, pelagic	Reduction in species richness or abundance resulting from toxicity	Aquatic community	Receptor toxicity data (reflected in toxicity thresholds) Water concentrations
Aquatic wildlife	Reduction in abundance or production of piscivorous wildlife populations resulting from toxicity	Representative wading birds and fish-eating mammals	Receptor toxicity data (reflected in toxicity thresholds) Water concentrations Sediment concentrations

9. Page 2 par 4. An evaluation of the on-site terrestrial receptors is recommended. The Appendix A checklist identified several terrestrial receptors observed during the site visit. Because adverse health effects were observed during the site visit, these receptors should be evaluated. Some portions of the site will most likely remain undeveloped, even as other portions of the site are redeveloped. Ecotoxicity values and exposure parameters for these receptors should be provided and tissue uptake and bioaccumulation from soil should be added to the site CSM.

Response: We disagree that it is appropriate for this site to evaluate terrestrial receptors, because of current and anticipated future uses of the site. This item relates to #6, which we would like to discuss with USEPA.

10. Page 3 par 2. It is recommended that the chronic exposure surface water screening ecotoxicity values (Illinois WQC and ~~USEPA~~) and lowest effect levels (LELs) from Persaud et al. (1993) be used for the SLERA.

Response: We agree, and will use these values in the SLERA

11. Page 3 par 5. Note that bioaccumulation factors are appropriate and recommended for estimating dietary exposure to higher trophic levels if measured tissue concentrations are not available.

Response We agree. See response to #7.

12. Page 4 par 2. Correct to "An HQ more than 1.0 suggests that..."

Response: We will correct this error

13. Page 4 par 3. The SLERA should provide a definition of the community-level of effects to be evaluated. A community- or population-level of assessment should be clearly defined, as this level of assessment may include an evaluation of site-specific assumptions, such as spatial evaluation or a refinement of contaminants of concern, which is not appropriate for a SLERA. Refining contaminants of concern by evaluating frequency and magnitude of detection, background concentrations, or dietary considerations should be reserved for a baseline ERA.

Response: If we understand this comment correctly, it is saying that certain elements of a community level assessment are not appropriate in a SLERA. The above table in the response to comment #8 clarifies what assessment and management endpoints will be used We would appreciate a clarification of this comment from USEPA.

We do not plan to evaluate the frequency and magnitude of detection, or background concentrations. Dietary considerations, however, are a part of the assessment of exposure parameters for wading birds and piscivorous mammals.

14. Checklist. Should provide additional description of the adverse impacts to trees in the northern part of the site.

Response: We will provide this description in the SLERA.

15. CSM. Surface water ingestion should be included as a complete exposure pathway for wading birds and piscivorous animals. Further clarification should be provided on the "land use" column, or it should be removed. It is not clear if all relevant receptors considered have on-site habitat. "Habitat requirements consistent with current or future uses" for terrestrial receptors is not consistent with the main text (page 2, par 4).

Response: We will include this pathway in the CSM, and it will be addressed through the evaluation described under #7 above.

The column referred to is intended as a screening criterion to identify relevant receptors on the site. Namely, that relevant receptors are those whose habitat requirements are consistent with current and future uses. The relevant receptors identified through this screening are all off-site aquatic receptors because habitat requirements for on-site receptors are not consistent with current and futures uses of the site.

Current information indicates that the property will be redeveloped. As described in the December 19 letter from Thomas Gooding, the City of Hillsboro Planning Commission is recommending that the City "acquire the Eagle Zinc property for use as an industrial park subject to a mutually acceptable agreement with the current owner especially with respect to environmental aspects of the property."

This comment is tied into comments #6 and #9 related to current and future uses of the site, and we would like to discuss this issue with USEPA.

VOC Issue

Concerning the VOC issues noted in your January 14, 2004 correspondence, based on the concentrations detected, which were lower that previous sampling results, ENVIRON and the Parties consider this a negligible relict of the long industrial history of the site. These detections likely reflect a small historic loss of TCE or a product containing this chemical in the vicinity of the upper reaches of the drainageway. As previously discussed with the Agency, the results of previous sampling indicate that there are no associated soil or ground water impacts, and the impacted surface water does not extend off-site (i.e., the data represent surface water in a limited, well-defined stretch of the drainageway). As we discussed, these data will be fully evaluated during the risk assessments. Should the results indicate a risk, better definition of the nature and extent may be warranted.

We appreciate the opportunity to respond to these issues and would like to discuss them with you further at your convenience.

Sincerely,

ENVIRON International Corporation

F. Ross Jones

F. Ross Jones, P.G.
Manager

cc: T Krueger – EPA ORC
R. Lanham – IEPA
C. English – CH2M Hill
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February 4, 2004

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Mr. Dion Novak
Remedial Project Manager (SR-6J)
U.S. Environmental Protection Agency
Region 5
77 W. Jackson Blvd
Chicago, IL 60604-3590

Subject: WA No. 219-RSBD-B5Y7, Contract No. 68-W6-0025
Eagle Zinc Site, Hillsboro, Illinois
Comments on Reponses to EPA Comments - Human Health and Screening Level Ecological Risk Assessment Approaches

Dear Dion:

As requested, we have reviewed ENVIRON's letter dated January 26, 2004, in which ENVIRON responds to EPA's comments on the proposed human health and ecological risk assessment approaches for the Eagle Zinc site. EPA's comments to ENVIRON were provided in a letter dated December 30, 2003, and ENVIRON's original submittal to EPA was sent on November 3, 2003.

In their January 26, 2004 letter, ENVIRON also responded to EPA's January 14, 2004 email notification that volatile organic compounds (VOCs) in the western drainageway had not been adequately delineated by the investigation that was completed in November 2003. This letter provides our comments on ENVIRON's response to the VOC issue.

Review of ENVIRON's Responses to Comments

Based on our review of ENVIRON's January 26, 2004 letter, we have general concerns regarding the proposed screening-level ecological risk assessment (SLERA) approach. In addition, several of EPA's specific comments were not adequately addressed by ENVIRON's responses. Each specific comment is presented below, followed by our review of ENVIRON's response to the comment.

General Concerns on Proposed SLERA Approach

We have two general concerns about the SLERA approach proposed by ENVIRON. First, ENVIRON should provide information to support the assumption that physical impacts are indistinguishable from chemical impacts. In addition, they should clearly document all physical impacts and, if possible, provide information to support the assumption that habitats are not functioning ecologically.

Our concern is that, regardless of the SLERA results, risks from chemical concentrations may be dismissed because they are indistinguishable from the impact of physical stressors. We agree that, if impacts cannot be distinguished from chemical impacts, further evaluation beyond a SLERA is not necessary, as stated in USEPA guidance. However, it is possible that these impacts can be separated at the site although the current data may not be sufficient in this regard. This information would include such things as the rates of sedimentation, a quantified level of impact on the benthic community, levels of sedimentation necessary to impact benthic communities, and the condition of benthic communities in other drainageways with site-related chemical impacts but without sedimentation. This does not represent a data gap for the SLERA because this information is typically collected, provided, and evaluated in a baseline ecological risk assessment (BERA).

It should be noted that the assessment endpoints provided (impacts "resulting from toxicity"; Page 8 of January 26, 2004 letter) also do not support an approach to separate physical and chemical impacts. If this cannot be provided, then risks from chemical impacts should not be dismissed based on physical impacts in the SLERA.

Our second general concern is related to terrestrial receptors. In the December 30, 2003 letter to ENVIRON, EPA recommended that these receptors be evaluated in the SLERA. This recommendation was based on indications that 1) a significant amount of terrestrial habitat exists on-site; 2) on-site impacts to terrestrial habitat exist; and 3) there is documented use by terrestrial ecological receptors. Although the level of use by terrestrial receptors is not clear (e.g., whether the receptors are just passing through the site or are permanent residents), the evaluation is a conservative assumption consistent with a SLERA approach, regardless of future conditions.

Specific Comment #5, Table 2

EPA Comment:

If the potential for dermal exposure to groundwater is small, then the exposure pathway is complete and should be evaluated, regardless of whether Environ considers the exposure to be negligible. There continue to be reports of area citizens using private wells in the site vicinity-without some sort of comprehensive survey, it cannot be stated with certainty that the aquifer is not a source of water for the area. Finally, EPA comments asked for the evaluation of off-site migration of dust from the residue piles as a part of the investigation.

Modeling results or specific data must be presented to substantiate any preliminary conclusion here that dust has not migrated off site and no complete exposure pathway exists.

Summary of ENVIRON's Response:
In their response, ENVIRON agrees to evaluate dermal exposure in the human health risk assessment. However, regarding the private wells and off-site migration of dust from residue piles, ENVIRON cites May 2002 correspondence between EPA and ENVIRON and excerpts from the March 2003 Phase I Technical Memorandum. The following paragraph was included in their response to off-site migration of dust:

"Concerning lead and cadmium, all concentrations of these metals detected in off-site soils during the 1993 ESI are below current USEPA risk-based soil screening levels for residential land use. ENVIRON cannot comment on the resident's questions concerning growing vegetables. These questions are best directed to the local health department."

CH2M HILL Response:
CH2M HILL believes that the human health risk assessment can provide some value in addressing community concerns by including a fruit and vegetable ingestion pathway through gardening. We recommend that this ingestion pathway be included in the risk assessment.

Summary of ENVIRON's Response (continued):
Another paragraph from ENVIRON's response follows:

"The Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, in Section 13.2.4 states: As the aggregate pile weathers, however, potential for dust emissions is greatly reduced. In fact, the half-life of this erosion potential ranges between 1 and 4 minutes Therefore, any air erosion of the piles would be limited to a very short time period immediately following emplacement and would not be expected to occur over a protracted period of time. In addition, any impacts resulting from air erosion of residue piles would be expected to be the greatest closest to the source. Since no on-site soil impacts in the Northern Area of investigation were identified in the Phase 1 investigation, and existing off-site data show no impacts, off-site air erosion of residue piles and subsequent deposition is not considered a viable contaminant transport pathway at the Eagle Zinc site."

CH2M HILL Response:
If this assertion is correct, then modeling of particulate concentrations in air should produce relatively small contributions to total site risks. We recommend that an air pathway analysis and evaluation of potential inhalation exposures, and indirect exposures via deposition, associated with wind-blown dust, be included as part of the risk assessment. A limited-reservoir emissions model might be used in this analysis, if the conditions described in ENVIRON's response adequately reflect site conditions.

Specific Comment #13, Page 4, Paragraph 3

EPA Comment:
The SLERA should provide a definition of the community-level of effects to be evaluated. A community- or population-level of assessment should be clearly defined, as this level of assessment may include an evaluation of site-specific assumptions, such as spatial evaluation or a refinement of contaminants of concern, which is not appropriate for a SLERA. Refining contaminants of concern by evaluating frequency and magnitude of detection, background concentrations, or dietary considerations should be reserved for a baseline ERA.

ENVIRON Response:
If we understand this comment correctly, it is saying that certain elements of a community level assessment are not appropriate in a SLERA. The above table in the response to comment #8 clarifies what assessment and management endpoints will be used. We would appreciate a clarification of this comment from USEPA.

We do not plan to evaluate the frequency and magnitude of detection, or background concentrations. Dietary considerations, however, are a part of the assessment of exposure parameters for wading birds and piscivorous mammals.

CH2M HILL Response:
The dietary considerations mentioned are those related to the refinement of COCs, such as nutrient levels or absorptive capacity, that are often evaluated in the baseline ERA to refine the list of COCs. Dietary composition should be part of the assessment of exposure, as indicated.

VOC Delineation in Western Drainageway

In November 2003, ENVIRON collected surface water and sediment samples from the western drainageway to assess the nature and extent of VOCs in the drainageway channel. Analytical results from these samples indicated that VOC impacts extend at least as far as the most upstream sample, located roughly 400 feet from the drainageway's outlet into the southwest pond.

In an email dated January 14, 2004, EPA notified ENVIRON that the source of VOC impacts had not been defined and that VOC concentrations in the drainageway were of concern to the Agency. ENVIRON provided a response to EPA's email in their January 26, 2004 letter, stating that the VOC concentrations were a "negligible relict of the long industrial history of the site" and that VOC impacts in surface water are not migrating offsite. In addition, ENVIRON indicated that further investigation of the VOC impacts could be performed if current VOC results indicate an unacceptable risk to human health or the environment.

CH2M HILL believes that risk assessments would reveal that VOC concentrations in the western drainageway do not pose an unacceptable human health or ecological risk, under current conditions as they are characterized by the existing data. However, we disagree with ENVIRON's suggestion to terminate further investigation of these VOC impacts solely on the basis of probable risk assessment conclusions. Persistent VOC concentrations in surface water, even at low concentrations, indicate a possible upgradient source area, such as non-aqueous phase liquid (NAPL) in groundwater or contaminated soil resulting from previous spills of chlorinated solvents.

To provide the assurance that the existing VOC concentrations in sediments and surface water represent long term conditions, and do not pose a human health or ecological risk, we recommend that ENVIRON collect additional upstream surface water and sediment samples from the western drainageway to delineate the upgradient extent of VOC impacts in the drainageway channel. To support the conclusion that VOC concentrations, and therefore potential risks, will not increase in the future, we recommend that surface water samples be collected from the drainageway on a semi-annual or quarterly basis until at least November 2004, using the November 2003 sampling event as the initial data set in the monitoring effort.

EPA may consider requesting additional subsurface soil and groundwater samples upgradient from the western drainageway Such sampling may not reveal the source of VOCs in the drainageway, however, especially if the source area is small. In the event that a source area is not found, periodic sampling of the western drainageway will demonstrate whether VOC concentrations are actually decreasing over time, as ENVIRON states in their January 26, 2004 letter.

Human health and ecological risk assessments should be prepared now, rather than waiting for results from subsequent sampling at the site. If further investigation reveals elevated VOCs beyond the extent and concentrations already observed, the risk assessments can be modified later to include the supplemental data.

We hope that the comments and recommendations are helpful. Please call us if you have any questions regarding the attached document.

Sincerely,

CH2M HILL

Chris English, P.E.
Site Manager

STL\Risk Assessment RTC Letter.doc
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